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(54) Repositionable adhesive tape.

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EP 0 443 263 B1

Description

The invention is concerned with low-tack adhesives that substantially do not experience adhesion build-up, and so provide tapes that are repositionable, even after being adhered to a substrate for prolonged periods of time. Of special interest are low-tack pressure-sensitive adhesive note pads.

POST-IT™ note pads have become virtually indispensable in the office, each sheet bearing a stripe of pressure-sensitive adhesive that is sufficiently tacky to adhere to paper and other substrates but does not show a build-up of adhesion. The sheets can be cleanly removed and reapplied a number of times without loss of tackiness. These attributes are realized due to the use of tacky microspheres coated onto the paper substrate, as disclosed in U.S. Pat. No. 3,691,140 (Silver). The same low-tack pressure-sensitive adhesive has been used for a number of other purposes, e.g., as a coating for a bulletin board or for posting ordinary pieces of paper.

The widespread success of the POST-IT™ note pads and the relatively high cost of the adhesive have resulted in efforts to produce a pressure-sensitive adhesive of a more simple, and hence more economical, composition that would provide the same attributes. However, it is believed that every known pressure-sensitive adhesive has been deficient in some important respect, e.g., being too aggressively tacky or lacking the desired initial holding power or being subject to a gradual build-up in adhesion.

An adhesive that is said to afford similar properties as that used in POST-IT™ note pads is the subject of U.S. Pat. No. 4,684,685 (Shuman et al.). Shuman et al.'s preferred adhesive includes a natural rubber latex and a tackifier which is an anionic aqueous dispersion of hydrogenated rosin or rosin esters. After coating the dispersion onto a substrate such as a sheet of paper, the dried coating allegedly has enough tack to adhere to solid contact surfaces by manually pressing the coated substrate to that surface. The Shuman patent says that the user can then "reapply the coated substrate as many as eight to ten additional times to the same or another free solid surface."

Although there have been attempts at providing alternative adhesive formulations which provide properties suitable for use as a repositionable adhesive, such as for repositionable note pads, there is still great interest in the discovery of yet more alternatives.

Summary of the Invention

The invention provides a low-tack or no-tack adhesive-coated substrate comprising a flexible backing and a layer of an adhesive with a composition of by weight:

from 20 to 80 parts of at least one elastomeric block copolymer selected from styrene/butadiene and styrene/isoprene block copolymers, and

correspondingly from 80 to 20 parts of tackifying material selected from tackifier resin and a blend of tackifier resin and liquid plasticizer oil,

which adhesive has a composite midblock glass transition temperature (CMTg) determined by the Fox Equation (as defined herein) from 220 Kelvin to 240 Kelvin when the adhesive is based on styrene/isoprene block copolymer and a CMTg from 215 Kelvin to 235 Kelvin when the adhesive is based on styrene/butadiene block copolymer. The adhesive is a pressure-sensitive adhesive and can have the attributes of the adhesives of the Silver patent, while being more economical to manufacture because it is hot-melt coatable and does not require tiny balls of a stiff pressure-sensitive adhesive or cause the environmental problems of solvent coating methods. The mentioned tackifier resin can be blends.

As mentioned the adhesive can be hot-melt coated without the use of solvents and has a composite midblock glass transition temperature (CMTg) from 220 Kelvin to 240 Kelvin, preferably 225 Kelvin to 240 Kelvin, when the adhesive is based on styrene/isoprene block copolymers and a CMTg from 215 Kelvin to 235 Kelvin when the adhesive is based on styrene/butadiene block copolymer. The CMTg can be calculated using the Fox Equation from the measured Tg of the midblock of the elastomeric block copolymer and the measured Tg of each tackifying resin and liquid plasticizer oil. The Tg for each component is measured using a differential scanning calorimeter such as a DSC-7, manufactured by Perkin-Elmer.

Fox Equation

$$\frac{\sum_i W_i}{\text{CMTg}} = \sum_i \frac{W_i}{Tg_i}$$

where W_i is the weight fraction of component i and T_{gi} is the glass transition temperature of component i . Only the midblock portion of the block copolymer is included in the calculation of the CMTg. For a styrene/isoprene block copolymer, the midblock portion is the polyisoprene portion of the molecule.

- The Tg is measured on the second heating run using a scan rate of 20 degrees Centigrade per minute. The first heating run is made up to well above the softening point of the test material. The sample is subsequently quenched to well below the Tg of the material. Antioxidants added to the adhesive are not figured into the calculation of the CMTg.

- The tackifier resin or blend, or blend of tackifier resin(s) and liquid plasticizer oil(s) of the novel adhesive can be any of
- solid tackifier resin(s),
 - liquid tackifier resin(s),
 - blend of a solid tackifier resin(s) and liquid tackifier resin(s),
 - a blend of a solid tackifier resin(s) and liquid plasticizer oil(s),
 - and
 - a blend of solid tackifier resin(s), liquid tackifier resin(s), and liquid plasticizer oil(s).

- The blends are preferred, because they give a formulator more control over the rheological properties of the adhesive than does the use of a single tackifier resin. For example, when the proportion of elastomeric block copolymer is near the high end (i.e., 55-80 parts) and the CMTg is near the high end (i.e., within 10 Kelvin) of the aforementioned ranges, the adhesive tends to have high resistance to shear forces and to be low-tack or tack-free. This type of adhesive is best suited for use as a self-adhering adhesive. Its low, or no, tack makes it have little or no adhesion to other substrates while its high resistance to shear when attached to itself makes it ideal for a reuseable adhesive closure system.

- On the other hand, the adhesive can be somewhat tacky when the proportion of elastomeric block copolymer is near the low end (i.e., 20-45 parts) and the CMTg is near the high end of those ranges. These adhesives are generally usable as repositionable adhesive tapes, however, they will have a tendency to build up adhesion over extended periods of time. These adhesives however will still be self-adhering and show the characteristics discussed above.

- The least build-up of adhesion to other substrates is realized when both the proportion of elastomeric block copolymer and the CMTg are relatively low. These adhesives are the best suited for use as a repositionable tape on note pads, such as is used in a POST-IT™ pad. These tapes, however, will still display self adhesion properties, although generally with lower shear resistance.

- Overall, the lower build-up of adhesion to other substrates seems to be primarily related to CMTg, while the tendency to build up adhesion to itself seems to be primarily a function of percent polymer concentration. However, these observations are merely generally noted trends, and suitable adhesives for, e.g., self-adhering tape applications or repositionable tapes can be found outside the most likely areas to find such tapes within the invention composition.

- In addition to the foregoing components, the adhesive of the invention can incorporate small amounts of other materials commonly used in pressure-sensitive adhesives, e.g., antioxidants such as hindered phenols and hydroquinones, heat stabilizers such as zinc carbamates, ultraviolet stabilizers, fillers, and pigments. Such additional materials can be disregarded in the CMTg calculation.

- The said adhesive can be economically converted to tapes by being coated onto backings at high speeds without the use of solvents, or can be coated from solution when that is more convenient. Depending on the backing, the backings can be surface treated to promote adhesion of the adhesive thereto. The resulting tapes can be marketed in strips or in wide sheets and have flexible backings for ease of storage, handling, and application. For example, stripes of the novel adhesive can be coated onto paper which is then cut and stacked to form a tablet or note pad of repositionable sheets like the aforementioned POST-IT™ note pads. For such use, the adhesive is preferably somewhat tacky so that sheets of a note pad will adhere temporarily to paper and other substrates from which they can later be cleanly removed.

- For uses requiring the adhesive to be somewhat tacky, such as for a repositionable note pad, the CMTg can be as low as 220 Kelvin when the adhesive is based on styrene/isoprene block copolymers which comprise up to 45% by weight of the adhesive.

- Whether or not the novel adhesive is low-tack or tack-free, pieces of tape bearing the adhesive have a remarkable ability to form bonds to each other that have excellent resistance to shear forces. In tests, even after four months at ordinary room temperatures, two tapes bearing the adhesive separate cleanly between their adhesive layers. The same tapes also separate cleanly after two hours at 37 °C. However, low-tack adhesives with properties best suited for use as a repositionable adhesive have a tendency to block slightly at above ambient temperatures (e.g., at 37 °C).

The adhesive can be used to permit labels and masking tapes to be cleanly removed from substrates to which they may be applied. Other useful tape articles of the invention that have flexible backings include closable mailing envelopes, resealable bags, adhesive-backed sandpaper and sanding disks, and decals.

5 Detailed Disclosure

Elastomeric block copolymers that are useful in the adhesive of the invention can have any of the common configurations of the block structure including linear diblock and triblock, radial, star, and tapered geometries. Useful elastomers include styrene/isoprene block copolymers such as "Kraton" 1107 and
 10 "Kraton" 1111, available from Shell Chemical Co.; "Enichem" SOL T 190, available from Enichem USA; "Quintac" 3421, "Quintac" 3430 and "Quintac" 3530, available from Nippon-Zeion; Finaprene 424, available from Fina Chemical Co.; and styrene/butadiene block copolymers such as "Kraton" 1101 and 1102; "Stereon" 840A, available from Firestone Synthetic Latex and Rubber Co., and "Enichem" Sol T 1205 and Sol T 161 C;

Tackifier resins that are useful in the novel adhesives include those aliphatic hydrocarbon resins made from the polymerization of a feed stream consisting mainly of unsaturated species containing four to six carbon atoms, such as "Wingtack" 10, "Wingtack Plus", and "Wingtack" 95, available from the Goodyear Tire and Rubber Co., "Escorez" 1310, available from Exxon Chemical Co., and "Hercotac" RT-95, available from Hercules, Inc.; rosin esters and rosin acids such as "Hercoflex" 400, "Hercoflex" 500, "Foral" 85,
 20 "Regalite" 355, and "Permalyn" 305, all available from Hercules, Inc.; mixed aliphatic/aromatic liquid tackifiers such as "Escorez" 2520 available from Exxon Chemical Co.; and polyterpene tackifiers such as "Zonarez" A-25 and "Zonarez" A-100, available from Arizona Chemical Co. and "Piccolyte" HM-85, HM-105, and S-115 available from Hercules, Inc. Also useful are the general class of hydrogenated tackifying resins, including ECR-327, "Escorez" 5380, "Escorez" 5300, "Escorez" 5320, and "Escorez" 5340, all
 25 available from Exxon Chemical Co.; "Regalrez" 1018, "Regalrez" 1065, "Regalrez" 1078, "Regalrez" 1094, and "Regalrez" 1126, all available from Hercules Inc.; and "Arkon" P-90, "Arkon" P-100, "Arkon" M-90, and "Arkon" M-100, available from Arakawa Chemical Co.; hydrogenated polyterpene resins such as "Nirez" K-85, "Nirez" K-105, and "Nirez" K-110, available from Reichhold Chemicals, Inc.; and hydrogenated aliphatic and aliphatic/aromatic resins such as ECR-142H and ECR-143H, available from Exxon Chemical Co.
 30 Preferred tackifying resins include the aliphatic hydrocarbon resins, the hydrogenated resins, and the polyterpene resins. Especially preferred are the aliphatic hydrocarbon resins.

The liquid plasticizer oils suitable for use in the adhesive of the invention include naphthenic oils such as "Shellflex" 371, available from Shell Chemical Co., paraffinic oils, aromatic oils, and mineral oils such as "Kaydol" oil, available from Witco Chemical Corp. Preferred liquid plasticizers include naphthenic oil and
 35 mineral oil.

Testing

Some tapes bearing the said adhesive were subjected to one or more of the following tests:

40 Probe Tack Value

This is run according to ASTM D-2979 except using a Polyken Probe Tack tester with a polypropylene probe at a 1 cm/second probe speed, a 1 second dwell time, and a 100 gram/cm² load.

45 90° Peel Value

This is run according to PSTC-5 using a polyethylene substrate to which the test tape was applied using a 2-kg hard rubber roller, one pass in each direction at 30 cm/min. An adhesive which has a 90° Peel
 50 Value of from 2 to 8 N/25mm should be useful for making note pads of repositionable sheets like POST-IT™ note pads, because such adhesive-bearing sheets should adhere well to paper and other substrates while being removable without picking fibers, even after prolonged periods of time. When the 90° Peel Value is from 0 to 2 N/25mm, the adhesive would be most useful in the above-described adhesive-to-adhesive closure as these are the least likely to adhere to ordinary packaging materials or to non-adhesive
 55 surfaces and hence will not require the use of a protective tape. However, protective tapes can be avoided with even higher peel values.

180° Peel Value

This is run according to ASTM D-1000 except that the adhesive tape is applied to various substrates using a 2-kg hard rubber roller, one pass in each direction at 30 cm/min, and testing was carried out after less than 20 minutes dwell at ordinary room temperature. The peel rate is 30 cm/min when the substrate is paper and 225 cm/min when the substrate is metal or plastic.

Tapes are also tested after two weeks of accelerated aging at 120°F (49°C) and then allowed to cool to room temperature for testing.

180° Dynamic Shear Value

This value was determined using ASTM Test Method D3528-76 at a crosshead speed of 10 inches (25 cm) per minute.

T-Peel Value

This value was determined using ASTM Test Method D1876-72 at a crosshead speed of 10 inches (25 cm) per minute.

Self-Adhesion Peel Value

With the adhesive layers of two pieces of the same adhesive tape face-to-face, a 2-kg hard rubber roller is applied, one pass in each direction at 30 cm/min. The resulting sandwich is tested for T-peel by ASTM D-1876 at 30 cm/min.

Shear Adhesion Value

A one-inch square (2.54 cm-square) area of a test tape is laid with its adhesive layer against an embossed polyethylene substrate that is used as the backsheet of LUV's brand disposable diapers manufactured by Proctor and Gamble and is about 30 μm thick. To enhance the stiffness of the substrate, the polyethylene substrate is laminated to a pressure-sensitive adhesive tape, viz., Release Tape Y-9378 manufactured by 3M Co. On the side opposite the reinforcing tape, the test tape is rolled down onto the polyethylene substrate with a 2-kg hard rubber roller, one pass in each direction at 30 cm/min. The laminated substrate and the test tape are hung vertically in a 40°C oven for 15 minutes and a 500-gram weight is promptly hung from the test tape. The time for the weight to drop at 40°C is the Shear Adhesion Value.

The following examples, in which all parts are by weight, are given by way of illustration and are not intended to limit the scope of the invention in any way. Commercial materials used in the examples were:

ELASTOMERIC BLOCK COPOLYMERS		
		Tg
"Finaprene" 424	Styrene/isoprene block copolymer	215K
"Kraton" 1101	Styrene/butadiene block copolymer	188 K
"Kraton" 1107	Styrene/isoprene block copolymer	215 K
"Kraton" 1111	Styrene/isoprene block copolymer	215 K
"Quintac" 3430	Styrene/isoprene block copolymer	215 K

SOLID TACKIFIER RESINS		
		T _g
"Arkon" P-90	Hydrogenated hydrocarbon	309 K
"Escorez" 1310	C5 aliphatic	314 K
"Escorez" 5300	Hydrogenated hydrocarbon	323 K
"Foral" 85	Rosin ester	313 K
"Piccolyte" HM-105	Styrenated terpene	327 K
"Regalite" 355	Hydrogenated rosin acid	318 K
"Regalrez" 1094	Hydrogenated hydrocarbon	310 K
"Wingtack" 95	C5 aliphatic	323 K
"Wingtack Plus"	C5 aliphatic	315 K
"Zonarez" A-100	Alpha-pinene	328 K

LIQUID TACKIFIER RESINS

		T _g
ECR-143H	Hydrogenated hydrocarbon	247 K
"Escorez" 2520	Aromatic/aliphatic	253 K
"Hercoflex" 500	Rosin ester	238 K
"Wingtack" 10	C5 aliphatic	245 K
"Zonarez" A-25	Alpha-pinene	251 K

LIQUID PLASTICIZER OILS

		T _g
"Kaydol" Oil	Mineral oil	199 K
"Shellflex" 371	Naphthenic oil	209 K

ANTIOXIDANTS

"Irganox" 1076	Hindered Phenol (available from Ciba-Geigy)
"Irganox" 1010	Hindered Phenol

Examples 1-18

Eighteen adhesive compositions were prepared by dissolving in toluene the components of the formulations given in Table I. One part of "Irganox" 1076 was added to each adhesive composition. Each adhesive solution was 65% by weight of solvent. Tape samples were prepared by coating the adhesive solutions onto a matte-finish cast-polypropylene backing having a thickness of 100 μm . The coating weight of the adhesive after drying at 60 °C for 5 minutes was about 3.5 mg/cm².

Results of testing the tapes of Examples 1-18 are reported in Table II.

TABLE I
(Compositions for Examples 1-9 in Parts)

<u>Example</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
"Finaprene" 424	60								
"Kraton" 1107		75	50	65	40	80			
"Kraton" 1111							50	45	80
"Escorez" 2520		23	47	19					
"Kaydol" Oil							31	26	
"Shellflex" 371					43	7			
"Zonarez" A-25	32								16
"Arkon" P-90		2	3	16					
"Escorez" 1310	8								
"Escorez" 5300							19	29	
"Wingtack Plus"					17	13			
"Zonarez" A-100									4
Composite Midblock Tg (Kelvin)	235	225	235	235	225	225	225	235	225

TABLE I (CONT.)
(Compositions for Examples 10-18 in Parts)

<u>Example</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>
"Kraton" 1101						20	50
"Kraton" 1111	50	70					
"Quintac" 3430			75	40	60		
"Shellflex" 371						57	23
"Wingtack" 10			20	56	24		
"Zonarez" A-25	48	16					
"Piccolyte" HM-105						23	27
"Regalrez" 1094			5	4	16		
"Zonarez" A-100	2	14					
Composite Midblock Tg (Kelvin)	235	235	225	235	235	225	225

TABLE II

Example	Probe Tack (N)	90° Peel Value (N/25 mm)	Shear Adhesion Value (minutes)	Self-Adhesion Peel Value (N/25 mm)
1	4.2	1.4	2	2.2
2	0.9	0.3	<1	2.1
3	4.5	1.1	2	2.2
4	3.3	1.4	1	1.6
5	3.2	0.4	3	1.6
6	1.6	1.0	1	1.0
7	2.2	0.7	3	0.5
8	6.5	2.0	26	0.9
9	0.9	0.3	16	1.2
10	3.5	2.0	2	0.9
11	3.0	1.5	25	1.6
12	1.1	0.4	1	0.8
13	5.9	2.7	6	2.5
14	3.9	1.9	11	2.7
15	2.9	0.2	<1	0.2
16	2.6	0.8	<1	0.6

Comparative Examples A-G

A series of tapes were made in the same way as the tapes of Examples 1-16 except using adhesive compositions indicated in Table III. Some of the adhesive compositions were as taught in the prior art as follows:

Comparative Example	Adhesive as Taught in
F	Sample 10 of Example III in U.S. Pat. No. 3,954,692 (Downey)
G	Example 4 of U.S. Pat. No. 3,932,328 (Korpman)

TABLE III

(Compositions in Parts)							
Comparative Example	A	B	C	D	E	F	G
"Finaprene" 424	40						
"Kraton" 1107		50				100	100
"Quintac" 3430			40	30	40		
"Wingtack" 10				26	11		40
"Zonarez" A-25	22		6			20	
"Kaydol" Oil							
"Shellflex" 371		8					
"Wingtack" 95						100	100
"Escorez" 1310	38						
"Regalite" 355			54				
"Regalrez" 1094				44	49		
"Wingtack Plus"		42					
Composite Midblock Tg (Kelvin)	258	250	262	260	260	254	254

Testing of comparative examples A-G is reported in Table IV.

TABLE IV

Example	Probe Tack (N)	90° Peel Value (g/25 mm)	Shear Adhesion Value (minutes)	Self-Adhesion Peel Value (N/25 mm)
A	13	7.3	>1000	15
B	10	4.6	>1000	12
C	10	13.6	>1000	12
D	9	9.3	>1000	18
E	12	8.0	>1000	17
F	11	4.9	>1000	18
G	10	7.8	>1000	16

As indicated in Tables III and IV, comparative Examples A through G exhibit tack, peel, shear and self-adhesion values that are substantially greater than Example 1 through 10 and are typical of conventional pressure-sensitive adhesives that are based on elastomeric block copolymers.

Claims

1. A low-tack or no-tack adhesive-coated substrate comprising a flexible backing and a layer of an adhesive with a composition of by weight:
from 20 to 80 parts of at least one elastomeric block copolymer selected from styrene/butadiene and styrene/isoprene block copolymers, and
correspondingly from 80 to 20 parts of tackifying material selected from tackifier resin and a blend of tackifier resin and liquid plasticizer oil,
which adhesive has a composite midblock glass transition temperature (CMTg) determined by the Fox Equation (as defined herein) from 220 Kelvin to 240 Kelvin when the adhesive is based on styrene/isoprene block copolymer and a CMTg from 215 Kelvin to 235 Kelvin when the adhesive is based on styrene/butadiene block copolymer.
2. A low-tack or no-tack adhesive-coated substrate as claimed in claim 1, the flexible backing of which is paper.
3. A tablet of flexible adhesive-bearing backing sheets, each backing sheet bearing a layer of adhesive as defined in claim 1.
4. A low-tack or no-tack adhesive-coated substrate as claimed in claim 1 or claim 2 wherein said substrate comprises a label.
5. A low-tack or no-tack adhesive-coated substrate as claimed in any of claims 1, 2 or 4 wherein the CMTg is from 230 Kelvin to 240 Kelvin when the adhesive is based on styrene/isoprene block copolymer and wherein the CMTg is from 225 Kelvin to 235 Kelvin when the adhesive is based on styrene/butadiene block copolymer.
6. A low-tack or no-tack adhesive-coated substrate as claimed in claim 5 and comprising from 20 to 45 parts by weight of the elastomeric block copolymer.
7. A low-tack or no-tack adhesive-coated substrate as claimed in any of claims 1, 2, 4, 5 and 6 and containing both a tackifier resin and a liquid plasticizer oil.
8. A low-tack or no-tack adhesive-coated substrate as claimed in any of claims 1, 2 and 4 having a 90 degree peel value (as defined herein) of from 0 to 2N/25mm.
9. A low-tack or no-tack adhesive-coated substrate as claimed in claim 6 having a 90 degree peel value (as defined herein) of from 2 to 8N/25mm forming a repositionable adhesive-coated substrate.
10. A low-tack or no-tack adhesive-coated substrate as claimed in claim 9 wherein the adhesive is repositionable after at least 2 weeks at 49°C.

Patentansprüche

1. Mit einem schwach klebrigen oder nichtklebrigen Klebstoff überzogenes Substrat mit einem flexiblen Rücken und einer Schicht aus einem Klebstoff mit folgender Zusammensetzung auf Gewichtsbasis:
 5 20 bis 80 Teile aus mindestens einem elastomeren Blockcopolymer, das aus den Styrol-/Butadien- und den Styrol/Isopren-Blockcopolymeren ausgewählt ist; und
 dementsprechend 80 bis 20 Teile einer klebfähigmachenden Substanz, die aus einem klebfähigmachenden Harz und einem Gemisch aus einem klebfähigmachenden Harz und einem flüssigen Weichmacheröl ausgewählt ist;
 10 wobei die nach der (hierin definierten) Foxschen Gleichung bestimmte Mittelblock-Verbund-Einfrieretemperatur (CMTg) des Klebstoffs bei einem Klebstoff auf der Basis eines Styrol/Isopren-Blockcopolymers 220 bis 240 Kelvin und bei einem Klebstoff auf der Basis eines Styrol/Butadien-Blockcopolymers 215 bis 235 Kelvin beträgt.
- 15 2. Mit einem schwach klebrigen oder nichtklebrigen Klebstoff überzogenes Substrat nach Anspruch 1, in dem der flexible Rücken aus Papier besteht.
3. Block aus klebstofftragenden flexiblen Rückenblättern, in dem jedes Rückenblatt eine Schicht aus einem Klebstoff nach Anspruch 1 trägt.
- 20 4. Mit einem schwach klebrigen oder nichtklebrigen Klebstoff überzogenes Substrat nach Anspruch 1 oder 2, das einen Aufkleber bildet.
5. Mit einem schwach klebrigen oder nichtklebrigen Klebstoff überzogenes Substrat nach Anspruch 1, 2 oder 4, in dem die CMTg bei einem Klebstoff auf der Basis eines Styrol/Isopren-Blockcopolymers 230 bis 240 Kelvin und bei einem Klebstoff auf der Basis eines Styrol/Butadien-Blockcopolymers 225 bis 235 Kelvin beträgt.
- 25 6. Mit einem schwach klebrigen oder nichtklebrigen Klebstoff überzogenes Substrat nach Anspruch 5, in dem der Gehalt an dem elastomeren Blockcopolymer 20 bis 45 Gewichtsteile beträgt.
- 30 7. Mit einem schwach klebrigen oder nichtklebrigen Klebstoff überzogenes Substrat nach einem der Ansprüche 1, 2, 4, 5 und 6, das sowohl ein klebfähigmachendes Harz als auch ein flüssiges Weichmacheröl enthält.
- 35 8. Mit einem schwach klebrigen oder nichtklebrigen Klebstoff überzogenes Substrat nach einem der Ansprüche 1, 2 und 4 mit einer (wie hierin definierten) 90°-Schälfestigkeit von 0 bis 2 N/25 mm.
9. Mit einem schwach klebrigen oder nichtklebrigen Klebstoff überzogenes Substrat nach Anspruch 6 in Form eines mit einem wiederholt anklebbaren Klebstoff versehenen Substrats mit einer (wie hierin definierten) 90°-Schälfestigkeit von 2 bis 8 N/25 mm.
- 40 10. Mit einem schwach klebrigen oder nichtklebrigen Klebstoff überzogenes Substrat nach Anspruch 9, dessen Klebstoff nach mindestens 2 Wochen bei 49°C erneut anklebbar ist.
- 45

Revendications

1. Substrat revêtu d'un adhésif peu collant ou pas collant, comprenant un support souple et une couche d'adhésif ayant la composition suivante en poids :
 50 de 20 à 80 parties d'au moins un copolymère élastomère séquencé choisi parmi les copolymères de styrène/butadiène et de styrène/isoprène, et
 d'une manière correspondante, de 80 à 20 parties d'un matériau de pégosité choisi dans l'ensemble constitué par une résine conférant des propriétés collantes et un mélange de résine collante et d'une huile plastifiante liquide,
 55 ledit adhésif ayant une température de transition vitreuse de la séquence centrale du composite (CMTg) de 220 à 240° Kelvin, déterminée au moyen de l'équation de Fox (telle que définie ici), quand l'adhésif est à base de copolymère séquencé de styrène/isoprène, et une CMTg de 215 à 235° Kelvin quand l'adhésif est à base de copolymère séquencé de styrène/butadiène.

2. Substrat revêtu d'un adhésif peu collant ou pas collant tel que revendiqué dans la revendication 1, dont le support souple est constitué de papier.
3. Plaque d feuilles souples de support portant un adhésif, chaque feuille de support portant une couche d'adhésif tel que défini dans la revendication 1.
4. Substrat revêtu d'un adhésif peu collant ou pas collant tel que revendiqué dans la revendication 1 ou la revendication 2, ledit substrat formant une étiquette.
5. Substrat revêtu d'un adhésif peu collant ou pas collant tel que revendiqué dans l'une quelconque des revendications 1, 2 ou 4, dans lequel la CMTg est comprise entre 230 et 240 ° Kelvin quand l'adhésif est à base de copolymère séquencé de styrène/isoprène, et dans lequel la CMTg est comprise entre 255 à 235 ° Kelvin quand l'adhésif est à base de copolymère séquencé de styrène/butadiène.
6. Substrat revêtu d'un adhésif peu collant ou pas collant tel que revendiqué dans la revendication 5 et comprenant de 20 à 45 parties en poids de copolymère élastomère séquencé.
7. Substrat revêtu d'un adhésif peu collant ou pas collant tel que revendiqué dans l'une quelconque des revendications 1, 2, 4, 5 et 6 et contenant une résine collante ainsi qu'une huile plastifiante liquide.
8. Substrat revêtu d'un adhésif peu collant ou pas collant tel que revendiqué dans l'une quelconque des revendications 1, 2 et 4, ayant une valeur de décollement à 90 ° (telle que définie ici) comprise entre 0 et 2 N/25 mm.
9. Substrat revêtu d'un adhésif peu collant ou pas collant tel que revendiqué dans la revendication 6, ayant une valeur de décollement à 90 ° (telle que définie ici) comprise entre 2 et 8 N/25 mm, formant un substrat revêtu d'adhésif repositionnable.
10. Substrat revêtu d'un adhésif peu collant ou pas collant tel que revendiqué dans la revendication 9, dans lequel l'adhésif est repositionnable après au moins 2 semaines à 49 °C.